

**WHAT IS CLAIMED IS:**

1. An amorphous composition comprising an amorphous matrix, a metal ion selected from the group consisting of  $Gd^{3+}$ ,  $Fe^{+3}$  and  $Mn^{+2}$ , and a ligand, said composition having a selected induced magnetization at cryogenic temperatures.

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2. The composition of claim 1, wherein said ligand binds said metal ion and effects solubility thereof in said amorphous matrix.

3 The composition of claim 2, wherein said metal ion is  $Gd^{3+}$  and is in the form of  $Gd(Lg)_3$   
10 or, in the alternative, in the form of  $Gd(ACAc)_3$ , wherein Ac is acetylacetonate, and Lg is 2,2,6,6-tetramethyl-3, 5-heptanedionate.

4. The composition of claim 1, wherein said amorphous matrix comprises epoxy resin.

15 5. The composition of claim 1, wherein said amorphous matrix comprises a glass.

6. The composition of claim 1, wherein said amorphous matrix comprises a plastic.

7. The composition of claim 1, wherein said composition is characterized by magnetization  
20 equal to that of another selected material for exposure of both said materials by an applied magnetic field.

8. The composition of claim 1, wherein said selected magnetic susceptibility is zero.

25 9. The composition of claim 1, wherein said selected magnetic susceptibility is reached at a selected temperature below substantially  $77^{\circ}K$ .

10. The composition of claim 1, wherein said metal ion is  $Gd^{+3}$ .

30 11. A method of preparing an amorphous composition to exhibit a desired susceptibility at cryogenic temperatures, comprising the steps of:

mixing a metal ion selected from the group consisting of  $Gd^{3+}$ ,  $Fe^{+3}$  and  $Mn^{+2}$ , with an amorphous matrix and a ligand so that the resulting composition has a nearly zero magnetic susceptibility at said cryogenic temperatures.

12. The method of claim 11, wherein said ligand binds said metal ion and effects solubility thereof in said composition.

5 13. The method of claim 11, wherein said metal ion is Gd and is in the form selected from the group consisting of  $Gd(Lg)_3$  and  $Gd(AcAc)_3$ , wherein Ac is acetylacetonate, and Lg is 2,2,6,6-tetramethyl-3, 5-heptanedionate.

14 The method of claim 11, wherein said amorphous matrix is epoxy resin.

10 15. The method of claim 11, wherein said composition has a magnetization equal to the magnetization of another material in the presence of the same magnetic field.

15 16. An NMR apparatus comprising a magnet for producing a polarizing field and utilizing a composition subject to said polarizing field, said composition an amorphous comprising a selected amorphous material and a metal ion selected from the group consisting of  $Gd^{3+}$ ,  $Fe^{+3}$  and  $Mn^{+2}$ , and a ligand said composition having a selected value of magnetizationat cryogenic temperatures.

20 17. The NMR apparatus of claim 16, wherein said ligand binds said metal ion and effects solubility thereof in said composition.

18. The NMR apparatus of claim 16, wherein said cryogenic temperatures are at or below  $77^{\circ} K$ .

25 19. The NMR apparatus of claim 16, wherein said composition is surrounded by a material exhibiting a magnetization of zero and said selected value is zero.